the superiority of his particular education to any other, and his firm determination *to secure the pick of the available boys and the pick of the administrative posts* for the classical training. Science and research are to have those rejected as unfit in this sublime progress of the elect. Instead of our boys—I mean the boys destined for real philosophy, living literatures, science, and the study of actual social and political questions—having a straightforward, well-planned school course, they are to be *tried over* at Greek for just the most precious years educationally, and our modern world is to have the broken fragments. This claim is pressed even more impudently by Mr. Livingstone in his recent "Defence of Classical Education." He insists that all our sons are to be muddled about with by the teachers of Greek up to at least the opening of the university stage, entirely in the interests of Greek scholarship. Prof. Keeble's dream of "sweet reasonableness" is a mere dream. These classical people are absolutely ignorant of their own limitations; they can imagine no compromise; they mean to ram compulsory Greek down the throat of every able English boy they can catch, and they mean to load the scales in favour of Greek at any cost to science, philosophy, and national well-being.

Against this strangle-grip of the classic-worshipping mandarins on our higher English education such a book as "Science and the Nation" scarcely fights at all. Is it too much to suggest that scientific men should take a little more trouble collectively than they have hitherto done to master the essentials of this question, and to understand better what it is that really sustains the general contempt and distrust of modern knowledge in Great Britain and blocks the way to a widespread national support of research? H. G. Wells.

THE WORLD CRISIS AND AFTER.

Janus and Vesta: a Study of the World Crisis and After. By Benchara Branford. Pp. xviii + 316. (London: Chatto and Windus, 1916.) Price 6*s*. net.

THIS is not a "war book," but it makes a well-timed appearance, for in an England unillumined and unchastened by these last terrible years it might have found few readers capable of perceiving its value. The author should now, however, be assured of a large company who will accept his invitation to read his work "backwards and forwards in the belief that it will repay careful study." To one at least who has done so it seems a noble book, full of a wise and strong humanity, worthy to be classed with writings to which all men pay homage. Any scientific reader who will start with the chapter on "Science and Occupation" and follow whither the clue leads will probably reach much the same opinion.

Mr. Branford is well known in the educational world as a divisional inspector of the London County Council. He was once a lecturer on mathematics in the Victoria University, and was afterwards principal of the Technical College and Director of Education in the Borough of Sunderland. In 1908 he published an admirable "Study of Mathematical Education," which has been translated into German. In 1902, in conjunction with Prof. W. A. Bone, he issued proposals for a school of metallurgy, which recent unhappy experiences have shown to be as necessary as they were far-sighted. The statement of these facts will suffice to commend to scientific readers the views on educational reform that constitute a vital part of the present work; it should, nevertheless, be added that the author deals with all aspects of the problem of education with quite remarkable insight and breadth of sympathy. His zeal for universal vocational training is the expression of no narrow ideal of "national efficiency," but springs from a profound study of the conditions of development of the human spirit. It is, therefore, in complete harmony with his passionate conviction that a revival of university life (including a renaissance of the "wandering scholar") is one of the most urgent needs of the time, being necessary in order that the nations, old and young, may not only rise to the full height of their spiritual possibilities, but also learn, through the intercourse and mutual understanding of their best minds, to compose their historical discords.

In this connection Mr. Branford argues with much force that universities have, during the modern epoch, largely forgotten their catholic mission, and have become, in many insidious ways, organs for the cultivation of national separatism and egotism. As a remedy for this state of things he presses the suggestion of a "world university," neutral, as the Papacy is neutral, to be the guardian of the common spiritual interests of mankind, both Western and Eastern, as the Papacy was formerly the guardian of the common spiritual interests of the western European nations.

It is not possible in a short notice to follow in detail Mr. Branford's diagnosis of the diseases of our age, or to indicate the remedies he proposes. It must be enough to say that whether he speaks of things temporal or things spiritual, his voice has the authentic accent of the prophet. Like all true prophets, he shows not only the eager desire to know the things that belong to the peace of his own people, but also the depth of vision that reveals them *sub specie aeternitatis*. For this reason, though his ideas are often at first provocative, they are generally seen, on candid consideration, to be widely and solidly based. No one concerned with the problems of our State, internal or external, can afford to neglect them.

SCIENTIFIC OBSERVATION AND REASONING.

Comptes Rendus of Observation and Reasoning. By J. Y. Buchanan. Pp. xl + 452. (Cambridge: At the University Press, 1917.) Price 7*s*. 6*d*. net.

MR. BUCHANAN is a believer in original research in the full significance of the words, including originality in methods and point

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of view, as well as in the subject dealt with. Unlike his former volume of collected oceanographical papers, this collection consists of a selection on many subjects, scientific and popular, several reproduced from the pages of NATURE. The strictly scientific memoirs deal with the relation of ice and brine, steam and brine, calorimetry, and the occurrence of ice in Nature, mainly in the form of glaciers. These researches grew out of Mr. Buchanan's observations of melting sea-ice during the cruise of the *Challenger* in the Antarctic regions, and, as regards calorimetry, in part out of observations on solar radiation during a solar eclipse in Egypt. The memoirs themselves form solid and informing reading for students; but they are rendered entertaining by the extraordinarily copious analytical Table of Contents, which occupies thirty pages. In this each paper is not only analysed and epitomised by the author, but also annotated, and sometimes criticised. For example, the discussion (reprinted from NATURE, vol. lxix., p. 293) of the system of the Royal Society (and, for that matter, of all scientific societies) of referring the papers of fellows to unnamed referees, who may suggest or insert alterations, is illustrated by a delightful reminiscence. In explaining how they manage these things better in France, Mr. Buchanan gives this pleasing picture of an episode of his student days:—

"In the summer of 1867, while working in the laboratory of Wurtz in the Ecole de Médecine in Paris, I made some investigations on the products of the reaction of perchloride of phosphorus on salts of isethionic acid. I collected the results in a short paper, and, with Wurtz's approval, I proposed to offer it to the Academy. At that date Wurtz himself was not yet 'of the Institute,' but there was a standing custom that papers by his *élèves* were presented by Balard, the veteran discoverer of bromine. Accordingly, I took my paper with me and made a formal call on M. Balard, who received me with the greatest kindness and courtesy in his study, wearing, as had been the fashion in his younger days, a black frock-coat, and a white neckcloth taken twice round his neck. When I had expressed my desire that he would do me the honour to present my paper to the Academy, he replied at once that he would have the greatest pleasure in doing so. I handed him the paper, he presented it the following Monday, and it was published in the *Comptes rendus* of the next week."

Reference may be made to another annotated paper, the "Chemical and Physical Notes" which appeared originally in the "Antarctic Manual," prepared for Captain Scott's first expedition. These notes proved less useful than they should have been, as there was no trained chemist on the expedition, and the physicist who was appointed did not sail with the *Discovery*, and only joined her in Australia. Had there been a chemist of Mr. Buchanan's manipulative skill and keen insight the notes would have been most helpful, for he now tells us that he prepared them as memoranda for a worker by imagining that the worker was himself. In fact, we gather that they are the instructions which thirty years of experience had shown would have profited him most had he himself received them when he sailed on the *Challenger* in 1872. They will stand, we trust, as inspiration for the chemist of some future expedition. An interesting point about this paper is mentioned in the preface: "It was conveyed to me through an old friend and former colleague that this contribution to the 'Antarctic Manual' had done much to retard the standardisation of research. I took it as a compliment. To standardise research is to limit its freedom and to impede discovery. Originality and independence are the characteristics of genuine research, and it is stultified by the acceptance of standards and by the recognition of authority."

This expression of opinion is really a confession of faith, and Mr. Buchanan's consistent acceptance of it as a guide in his own work is apparent in every paper and article which he has written. It is one of the curious instances of history repeating itself, that in every age the really original thinker is treated as a heretic by organised bodies and conventional men, unless, or until, he can hold his own against all attempts at suppression, passive and active; then he becomes a prophet, whose disciples, in turn, exercise a like intolerance of the forerunners of the next advance.

H. R. M.

OUR BOOKSHELF.

A Practical Manual of Autogenous Welding (Oxy-Acetylene), with a Chapter on the Cutting of Metals with the Blowpipe. By R. Granjon and P. Rosemberg. Translated by D. Richardson. Fourth edition. Pp. xxii+244. (London: Charles Griffin and Co., Ltd., 1916.) Price 5*s*. net.

THE fact that three large editions of this English translation have been exhausted in less than three years is evidence of the value it has been to those interested in the special technical methods described. Owing to the special nature of the subjects dealt with, the chief demands for the book must have arisen from workshops and factories where the processes so fully described are in actual use.

Although autogenous welding by means of the oxy-acetylene blowpipe has been largely used in this country, it has not received the same amount of attention as it has in other countries, such as France, for instance, where the Union de la Soudure Autogène has done valuable work in the encouragement of research and in the improvement of the methods of application.

The book deals with the properties and manufacture of oxygen and acetylene, and with the erection, testing, and working of welding installations; practical information is given on the composition of the metal welding rods and cleaning fluxes used, and on the preparation and execution of welds; and the autogenous welding of iron, steel, copper, brass, bronze, aluminium, and other metals and alloys is considered in detail.

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